U.S. Department of the Interior U.S. Geological Survey

METAL INDUSTRY INDICATORS

November 1997

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

As of now, the latest leading indexes point to moderate growth for most U.S. metal industries in the months ahead. The primary metals leading index increased in October and three of the other four metal industry leading indexes increased in September, the latest month for which they are available. The turmoil in several East Asian economies clouds the prospects for metal industries somewhat, but it remains to be seen how great the effect on U.S. industries will be. The metals price leading index rose in September, the latest month for which it is available, an indication that the recent declines in some metal prices might be coming to an end.

The preliminary October **primary metals leading index** increased 0.8% to 128.3 from a revised 127.3 in September. The index's 6-month smoothed growth rate, a compound annual rate that measures the near-term trend, also increased, rising to 7.4% from a revised 6.9% in September. The continuing strength in the primary metals leading index indicates that moderate growth in the U.S. primary metal industries is likely in the months ahead.

Three of the four available index components, the average workweek in primary metals establishments, the Purchasing Managers' Index, and the S&P stock price index for diversified machinery, posted strong gains in October. The S&P stock price index, which is an average covering the entire month, was not overly influenced by the sharp drop in stock prices that occurred on October 27. The growth rate of the Journal of Commerce metals price index was the only index component to decline.

Because only four of eight index components were available, the October primary metals leading index should be considered preliminary. Sometimes revisions can be substantial when the other four components become available. The September leading index is a case in point. The September index, which was originally reported last month as showing a decline of 1.2%, has since been revised to show an increase of 0.2%.

The **steel leading index** increased 0.4% in September to 106.6 from a revised 106.2 in August. The index's 6-month smoothed growth rate edged up to 5.7% from a revised 5.6% in August. A large increase in inflation-adjusted shipments of appliances was more than enough to account for all of the increase in the leading index. The steel leading index points to continued modest near-term growth in the U.S. steel industry.

The **aluminum mill products leading index** climbed 1.7% in September to 147.0 from 144.6 in August, the largest increase in this index in almost 2 years. The index's 6-month smoothed growth rate moved up to 6.6% from a revised 4.0% in August. Commercial and industrial construction contracts made the largest contribution to the net increase in the index, as that volatile component recorded its highest level since September 1989. The growth rate of this leading index indicates that moderate growth in the U.S. aluminum mill products industry will likely continue in the coming months.

The **primary and secondary aluminum leading index** was essentially flat in September at 247.3 compared to 247.4 in August. The index's 6-month smoothed growth rate slowed to 9.7% from a revised 11.3% in August. The LME cash closing price for primary aluminum, the S&P stock price index for aluminum companies, and the ratio of shipments to inventories for motor vehicles and parts were negative contributors to the leading index. The growth rate of the leading index suggests healthy demand for aluminum, much of which will probably continue to be satisfied by imports. Consequently, U.S. primary aluminum activity will probably grow only modestly. (Tables and charts for the primary and secondary aluminum indexes are in a separate file.)

The **copper leading index** increased 0.9% in September to 123.4 from a revised 122.3 in August. The index's 6-month smoothed growth rate moved up to 3.1% from a revised 1.9% in August. The ratio of shipments to inventories for electronic and other electrical equipment accounted for two-thirds of the increase in the leading index. The latest capacity utilization rate for primary copper is 97.8%, higher than that of any other manufacturing industry reported by the Federal Reserve Board. The copper leading index

and capacity constraints for primary copper point to slow growth in the domestic copper industry into 1998.

Metals Price Leading Index Continues to Move Higher

All three available components of the metals price leading index increased in September, as the index rose 1.1% to 98.0 from a revised 96.9 in August. At 5.0%, the leading index's 6-month smoothed growth rate is the highest since April 1996. Both the growth rates of deflated new orders for U.S. nonferrous metals and building permits for new housing units registered strong increases. The growth rate for the deflated M2 money supply also moved higher in September. The remaining index component, the growth rate of the Organization for Economic Cooperation and Development total leading index, declined in August, the latest month for which it is available, but its growth rate is still above +1.0%, an indication of increasing growth.

The growth rate of the deflated value of nonferrous metal products inventories held in the United States was flat in September, holding even with August's revised growth rate of 3.2%. This growth rate is a measure of changes in the supply of nonferrous metal products in the United States. London Metal Exchange inventories for aluminum, copper, lead, and zinc, the four metals in the MII nonferrous price index, have also leveled off, after increasing from May into mid-October.

The metals price leading index, which is an indicator of future demand for metals, is signaling growth in metal prices that could begin sometime in early 1998. Although the recent slowdown in metals inventory accumulation is supportive of higher metal prices, concerns about the economic crisis in several Asian countries could send metal prices lower. The business cycle and inventories are only two factors that affect metal prices. Other factors that affect prices include changes in metals production, speculation, strategic stockpiling, and production costs.

An explanation of the indexes and the 6-month smoothed growth rates appears on page 12.

Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

		Six-Month Smoothed Growth Rates				
	Leading Index of Metal Prices (1967=100)	MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982$)	Primary Aluminum	Primary Copper	Steel Scrap
1996						
September	94.4r	-26.8	10.9	-23.5	-37.6	-1.3
October	94.4r	-21.1	9.2	-16.6	-31.7	-13.3
November	94.5r	2.1	6.3	-2.8	11.8	-26.3
December	94.6r	-6.9	5.3	-2.0	-11.2	-21.8
1997						
January	95.4r	6.5r	-0.2	9.8	6.6	-6.6
February	96.0r	11.0	-0.9	12.7	10.5	3.7
March	96.1r	10.4	-3.7	10.1	11.2	-3.3
April	95.9r	9.7	-3.7	10.8	12.2	-8.5
May	95.6r	18.4r	-5.1r	11.0	30.7	2.0
June	95.6r	15.1	-4.4	5.1	25.8	3.4
July	96.4r	16.2r	2.6	21.0	3.4	11.6
August	96.9r	4.8r	3.2r	4.6	-12.5	13.6
September	98.0	1.3r	3.2	9.3	-15.9	4.6
October	NA	-8.5	NA	3.6	-25.3	6.7

r *- Revised*

Note: The components of the Leading Index of Metal Prices are the 6-month smoothed growth rates of the following: 1, the deflated value of new orders for nonferrous metals; 2, the OECD leading index, total; 3, the index of new private housing units authorized; and 4, the deflated value of U.S. M2 money supply. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metals and nonferrous metal products. Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.

Sources: U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); the Bureau of the Census; and the Organization for Economic Cooperation and Development (OECD).

Link To:

Chart 1.

Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
November	119.9r	1.3r	108.7	3.4
December	121.0r	2.7r	109.0	3.5
1997				
January	121.1r	2.5r	109.1	3.0
February	122.3r	3.9r	109.7	3.5
March	123.3r	5.0r	109.9	3.3
April	123.8r	5.2r	110.5	3.7
May	124.9r	6.4r	110.4	3.1
June	125.2r	6.1r	110.7r	3.1r
July	126.1	6.9r	111.0r	3.0r
August	127.1r	7.5	111.5r	3.4r
September	127.3r	6.9r	112.2	4.0
October	128.3	7.4	NA	NA

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**September**	**October**
1. Average weekly hours, primary metals (SIC 33)	-0.1r	0.4
2. S&P stock price index, machinery, diversified	-0.2r	0.3
3. Ratio of price to unit labor cost (SIC 33)	0.3	NA
4. JOC metals price index growth rate	-0.1r	-0.3
5. New orders, primary metals, (SIC 33) 1982$	0.3	NA
6. Index of new private housing units authorized by permit	0.2	NA
7. Growth rate of U.S. M2 money supply, 1992$	0.1	NA
8. Purchasing Managers' Index	-0.3r	0.4
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.2r	0.8

Coincident Index	**August**	**September**
1. Industrial production index, primary metals (SIC 33)	0.0r	0.4
2. Total employee hours, primary metals (SIC 33)	0.7r	-0.1
3. Value of shipments, primary metals, (SIC 33) 1982$	-0.2	0.2
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.6r	0.6

Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's; 3, Center for International Business Cycle Research, Bureau of Labor Statistics, and Federal Reserve Board; 4, Journal of Commerce; 5, Bureau of the Census and U.S. Geological Survey; 6, Bureau of the Census and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

NA*: Not available* ***r*** *- Revised*

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

Links To:

Chart 2.

Chart 3.

Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
October	101.2r	-2.4r	98.9	2.0
November	101.8r	-1.3r	98.2	0.3
December	102.5r	0.1r	98.7	1.1
1997				
January	102.9r	0.8r	99.3	2.1
February	103.6r	2.0r	99.0	1.2
March	104.1r	2.9r	99.2	1.4
April	103.9r	2.2r	99.6	1.9
May	104.0r	2.3r	99.6	1.4
June	104.6r	3.3r	99.5	1.1
July	104.5r	2.9r	99.6	1.0
August	106.2r	5.6r	99.8r	1.4r
September	106.6	5.7	100.2	1.9

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 5.
The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**August**	**September**
1. Average weekly hours, blast furnaces and basic steel products (SIC 331)	0.6r	-0.2
2. New orders, steel works, blast furnaces, and rolling and finishing mills, 1982$, (SIC 331)	-0.2	0.1
3. Shipments of household appliances, 1982$	0.0	0.5
4. S&P stock price index, steel companies	0.2	0.0
5. Industrial production index for automotive products	0.7r	0.1
6. Growth rate of the price of steel scrap (#1 heavy melting, $/ton)	0.0	-0.1
7. Index of new private housing units authorized by permit	-0.1	0.2
8. Growth rate of U.S. M2 money supply, 1992$	0.5	0.1
9. Purchasing Managers' Index	-0.2	-0.3
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	1.5r	0.4
Coincident Index		
1. Industrial production index, basic steel and mill products (SIC 331)	-0.1r	0.3
2. Value of shipments, steel works, blast furnaces, and rolling and finishing mills (SIC 331), 1982$	-0.2	0.1
3. Total employee hours, blast furnaces and basic steel products (SIC 331)	0.5r	0.0
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.3r	0.5

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey; 4, Standard & Poor's; 5, Federal Reserve Board; 6, Journal of Commerce and U.S. Geological Survey; 7, Bureau of the Census and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

NA*: Not available* ***r*** *- Revised*

Links To:

Chart 4.

Chart 5.

Table 6.
The Aluminum Mill Products Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
October	137.3r	-1.1r	123.9r	1.8
November	139.3r	1.4r	124.5r	2.6r
December	140.1r	2.5r	124.5	2.3r
1997				
January	141.0r	3.4r	123.0	-0.4r
February	143.0r	5.5r	125.5	2.9r
March	143.0r	4.8r	126.8	4.5r
April	143.7r	4.9r	125.4	1.9r
May	143.8r	4.5r	125.2	1.3r
June	143.6r	3.8r	126.8	3.5
July	144.1r	4.0	127.8r	4.3r
August	144.6	4.0r	126.4r	1.7r
September	147.0	6.6	127.1	2.4

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 7.
The Contribution of Each Aluminum Mill Products Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**August**	**September**
1. Average weekly hours, aluminum sheet, plate, and foil (SIC 3353)	0.1	0.4
2. Index of new private housing units authorized by permit	-0.1	0.2
3. Industrial production index for automotive products	0.8r	0.1
4. Construction contracts, commercial and industrial (square feet)	-0.6	0.8
5. Net new orders for aluminum mill products (pounds)	-0.4	0.2
6. Growth rate of U.S. M2 money supply, 1992$	0.6	0.1
7. Purchasing Managers' Index	-0.2	-0.3
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.3r	1.6
Coincident Index		
1. Industrial production index, aluminum sheet, plate, and foil (SIC 3353)	-0.7r	0.1
2. Total employee hours, aluminum sheet, plate, and foil (SIC 3353)	0.0	0.0
3. Shipments of aluminum mill products (pounds)	-0.4r	0.4
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-1.0r	0.6

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Federal Reserve Board; 4, F.W. Dodge, Division of McGraw-Hill Information Systems Company; 5, The Aluminum Association, Inc. and U.S. Geological Survey; 6, Federal Reserve Board, Conference Board, and U.S. Geological Survey; 7, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey. All series are seasonally adjusted.

NA: Not Available *r - Revised*

Links To:

Chart 6.

Chart 7.

Table 8.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1996				
October	119.2	1.5	114.8	3.9
November	121.0	3.9	113.3	1.0
December	120.2	2.1	114.3	2.5
1997				
January	120.2	1.9	113.8	1.4
February	122.0	4.2	114.1	1.7
March	123.5	6.1	113.7	0.8
April	121.8	2.7	114.2	1.3
May	122.7	3.9	113.5	0.1
June	122.8	3.6	113.9r	0.5r
July	121.7	1.4	113.2r	-0.8r
August	122.3r	1.9r	114.1	0.6
September	123.4	3.1	114.9	1.7

r *- Revised*

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 9.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

Leading Index	**August**	**September**
1. Average weekly overtime hours, rolling, drawing, and extruding of copper (SIC 3351)	0.2r	0.1
2. New orders, nonferrous and other primary metals, 1982$	0.0	0.3
3. MII stock price index, copper companies	0.1	-0.3
4. Ratio of shipments to inventories, electronic and other electrical equipment (SIC 36)	0.6r	0.6
5. Growth rate of the LME spot price of primary copper	-0.4	-0.1
6. Index of new private housing units authorized by permit	-0.1	0.3
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	0.4r	0.9
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (SIC 3331)	0.0r	0.0
2. Total employee hours, rolling, drawing, and extruding of copper (SIC 3351)	1.3r	0.2
3. Copper refiners' shipments (short tons)	-0.7	0.5
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.7	0.8

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, U.S. Geological Survey; 4, Bureau of the Census and U.S. Geological Survey; 5, London Metal Exchange and U.S. Geological Survey; 6, Bureau of the Census and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3 and 5 of the leading index.

NA*: Not available* ***r*** *- Revised*

Links To:

Chart 8.

Chart 9.

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930's. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.[1]

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

Three of the metal industry coincident indexes, those for primary metals, steel, and aluminum mill products, reflect their classifications in the U.S. Standard Industrial Classification (SIC). The SIC is the main classification used by the United States government and industry in collecting and tabulating economic statistics. Two of the coincident indexes, one for copper and one for primary and secondary aluminum, are blends of two different copper and aluminum industries, respectively.

Of the five metal industries, primary metals is the broadest, consisting of twenty-six different metal processing industries. The steel, aluminum, and copper industries are parts of the primary metals industry.

The metal industry leading indexes turn before their respective coincident indexes an average of 9 months for primary metals, 8 months for steel, and 7 months for copper. The average lead time for the leading indexes of aluminum mill products and primary and secondary aluminum is 6 months.

[1]**Business Cycle Indicators, A monthly report from The Conference Board** (March 1996).

The leading index of metal prices, also published in the Metal Industry Indicators, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 7 months in advance.

The growth rate used in the Metal Industry Indicators is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12-month moving average}}\right)^{\frac{12}{6.5}} - 1.0\right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below -1.0% usually means declining growth.

The next summary is scheduled for release on MINES FaxBack at 10:00 a.m. EST, Friday, December 19. Access MINES FaxBack from a touch-tone telephone attached to a fax machine by dialing 703-648-4999. The address for Metal Industry Indicators on the World Wide Web is: http://minerals.er.usgs.gov/minerals/pubs/mii/

The **Metal Industry Indicators** is produced at the U.S. Geological Survey by the Minerals Information Team. The report is prepared by Kenneth Beckman (703-648-4916), e-mail (kbeckman@usgs.gov), and Gail James (703-648-4915), e-mail (gjames@usgs.gov). The Center for International Business Cycle Research at Columbia University and the former U.S. Bureau of Mines developed the metal industry leading and coincident indexes. Customers can send mail concerning the Metal Industry Indicators to the following address:

U.S. Geological Survey
Minerals Information Team
988 National Center
Reston, Virginia 20192